CLAIMS

What is claimed is:

1. A method for generating a halftone from a plurality of pixels, comprising:

modulating dot density according to pixel intensity;

controlling dot cluster size according to pixel intensity; and

modulating dot size according to pixel intensity.

2. The method of Claim 1, wherein modulating dot density comprises implementing an error diffusion algorithm that is a function, at least indirectly, of pixel intensity.

3. The method of Claim 2, further comprising, for at least one pixel, obtaining a dot density factor corresponding to the pixel's intensity, and wherein implementing an error diffusion algorithm comprises implementing an error diffusion algorithm that is a function, at least in part, of the dot density factor.

4. The method of Claim 1, further comprising, for at least one pixel, obtaining a cluster factor corresponding to the pixel's intensity and wherein:

controlling dot cluster size comprises calculating a threshold value as a function, at least in part, of a dot screen and the cluster factor; and

modulating dot density comprises implementing an error diffusion algorithm that is a function, at least indirectly, of the pixel's intensity and the threshold value.

5. The method of Claim 4, further comprising obtaining a dot density factor corresponding to the pixel's intensity, and wherein implementing an error diffusion algorithm comprises implementing an error diffusion algorithm that is a function, at least in part, of the dot density factor and the threshold value.

6. The method of Claim 2, further comprising obtaining a dot size factor corresponding to the pixel's intensity and wherein:

implementing the error diffusion algorithm generates a dot placement indicator; and

modulating dot size comprises generating a halftone print code as a function of the dot size factor and the dot placement indicator.

7. The method of Claim 1, wherein for each pixel:

controlling a size of a dot cluster comprises obtaining a cluster factor corresponding to the pixel's intensity and calculating a threshold v alue as a function of a dot screen and the cluster factor;

modulating dot density comprises obtaining a dot density factor corresponding to the pixel's intensity and implementing an error diffusion algorithm that is a function of the dot density factor and the threshold value to generate a dot placement factor; and

modulating dot size comprises obtaining a dot size factor corresponding to the intensity value and generating a halftone print code as a function of the dot size factor and the dot placement indicator.

8. The method of Claim 7, wherein:

obtaining a cluster factor comprises locating a first look-up table entry corresponding to the pixel's intensity and acquiring the cluster factor from that first entry;

obtaining a dot density factor comprises locating a second look-up table entry corresponding to the pixel's intensity and acquiring the dot density factor from that second entry; and

obtaining a dot size factor comprises locating a third look-up table entry corresponding to the pixel's intensity and acquiring the d ot size factor from that third entry.

9. The method of Claim 8, wherein the first, second, and third entries are a single look-up table entry.

10. The method of Claim 7, wherein:

obtaining a cluster factor comprises calculating the cluster factor according to the pixel's intensity;

obtaining a dot density factor comprises calculating the dot density factor according to the pixel's intensity; and

obtaining a dot size factor comprises calculating the dot size factor according to the pixel's intensity.

11. A method for generating a halftone from a plurality of pixels, comprising for at least one pixel:

obtaining a cluster factor corresponding to the pixel's intensity and calculating a threshold value as a function of a dot screen and the cluster factor;

obtaining a dot density factor corresponding to the pixel's intensity and implementing an error diffusion algorithm that is a function of the dot density factor and the threshold value to generate a dot placement factor; and

obtaining a dot size factor corresponding to the intensity value and generating a halftone print code as a function of the dot size factor and the dot placement indicator.

12. A computer readable medium having instructions for:

modulating dot density according to pixel intensity;

controlling dot cluster size according to pixel intensity; and

modulating dot size according to pixel intensity.

13. The medium of Claim 12, wherein the instructions for modulating dot density include instructions for implementing an error diffusion algorithm that is a function, at least indirectly, of pixel intensity.

14. The medium of Claim 13, having further instructions for obtaining, for at least one of a plurality of pixels, a dot density factor corresponding to the pixel's intensity, and wherein the instructions for implementing an error diffusion algorithm include instructions for implementing an error diffusion algorithm that is a function, at least in part, of the dot density factor.

15. The medium of Claim 12, having further instructions for obtaining, for at least one of a plurality of pixels, a cluster factor corresponding to the pixel's intensity and wherein:

the instructions for controlling dot cluster size include instructions for calculating a threshold value as a function, at least in part, of a dot screen and the cluster factor; and

the instructions for modulating dot density include instructions for implementing an error diffusion algorithm that is a function, at least indirectly, of the pixel's intensity and the threshold value.

16. The medium of Claim 15, having further instructions for obtaining a dot density factor corresponding to the pixel's intensity, and wher ein the instructions for implementing an error diffusion algorithm include instructions for implementing an error diffusion algorithm that is a function, at least in part, of the dot density factor and the threshold value.

17. The medium of Claim 13, having further instructions for obtaining, for at least one of a plurality of pixels, a dot size factor corresponding to the pixel's intensity and wherein the instructions for:

implementing the error diffusion algorithm generates a dot placement indicator; and

modulating dot size include instructions for generating a halftone print code as a function of the dot size factor and the dot placement indicator.

18. The medium of Claim 12, wherein the instructions for:

controlling a size of a dot cluster include instructions for obtaining, for at least one of a plurality of pixels, a cluster factor corresponding to the pixel's intensity and calculating a threshold value as a function of a dot screen and the cluster factor;

modulating dot density include instructions for obtaining a dot density factor corresponding to the pixel's intensity and implementing an error diffusion

algorithm that is a function of the dot density factor and the threshold value to generate a dot placement factor; and

modulating dot size include instructions for obtaining a dot size factor corresponding to the intensity value and generating a halftone print code as a function of the dot size factor and the dot placement indicator.

19. The medium of Claim 18, wherein the instructions for:

obtaining a cluster factor include instructions for locating a first look-up table entry corresponding to the pixel's inten sity and acquiring the cluster factor from that first entry;

obtaining a dot density factor include instructions for locating a second look-up table entry corresponding to the pixel's intensity and acquir ing the dot density factor from that second entry; and

obtaining a dot size factor include instructions for locating a third look-up table entry corresponding to the pixel's inten sity and acquiring the dot size factor from that third entry.

20. The medium of claim 19, wherein the first, second, and third entries are a single look-up table entry.

21. The medium of Claim 18, wherein the instructions for:

obtaining a cluster factor include instructions for calculating the cluster factor according to the pixel's intensity;

obtaining a dot density factor include instructions for calculating the dot density factor according to the pixel's intens ity; and

obtaining a dot size factor include instructions for calculating the dot size factor according to the pixel's intensity.

22. A computer readable medium having instructions for:

for at least one of a plurality of pixels, obtaining a cluster factor corresponding to the pixel's intensity and calculating a threshold v alue as a function of a dot screen and the cluster factor;

obtaining a dot density factor corresponding to the pixel's intensity and implementing an error diffusion algorithm that is a function of the dot density factor and the threshold value to generate a dot placement factor; and

obtaining a dot size factor corresponding to the intensity value and generating a halftone print code as a function of the dot size factor and the dot placement indicator.

23. A halftoning system, comprising:

a placement control operable to modulate a dot density according to pixel intensity and to control a size of a dot cluster according to pixel intensity; and

a size control operable to modulate a dot size according to pixel intensity.

24. The system of Claim 23, wherein the placement control is operable to modulate a dot density by implementing an error diffusion algorithm that is a function, at least indirectly, of pixel intensity.

25. The system of Claim 24, further comprising a look-up table of dot density factors and a look-up table control operable to acquire a dot density factor from the look-up table, the acquired dot density factor corresponding to a given pixel's intensity , and wherein the placement control is operable to implement an error diffusion algorithm that is a function, at least in part, of the dot density factor.

26. The system of Claim 23, further comprising a look-up table of cluster factors and a look-up table control operable to acquire a cluster factor from the look-up table, the acquired cluster factor corresponding to a given pixel's intensity, and wherein the placement control is operable to calculate a threshold value as a function, at least in part, of a dot screen and the cluster factor and to implement the error diffusion algorithm that is a function, at least indirectly, of the pixel's intensity and the threshold value.

27. The system of Claim 26, further comprising a look-up table of dot density factors and wherein the look-up table control is operable to acquire a dot

density factor from the dot density look-up table, the acquired dot density factor corresponding to a given pixel's intensity, and wherein the placement control is operable to implement the error diffusion algorithm that is a function, at least in part, of the dot density factor and the threshold value.

28. The system of Claim 24:

further comprising a look-up table of dot size factors and a look-up table control operable to acquire a dot size factor from the look-up table, the acquired dot size factor corresponding to a given pixel's intensity;

wherein the placement control is operable to implement the error diffusion algorithm to generate a dot placement indicator; and

wherein the size control is operable to modulate a dot size by generating a halftone print code as a function of the dot size factor and the dot placement indicator.

29. The system of Claim 23, wherein:

the placement control is operable to control a size of a dot cluster by calculating a threshold value as a function of a dot screen and a cluster factor corresponding to a given pixel's intensity and to modulate a dot density by implementing an error diffusion algorithm that is a function of the threshold value and a dot density factor corresponding to the pixel's intensity in order to generate a dot placement factor; and

the size control is operable to modulate a dot size by generating a halftone print code that is a function of the dot placement indicator and a dot size factor corresponding to the pixel's inten sity.

30. The system of Claim 29, further comprising:

a dot cluster look up table;

a dot density look-up table;

a dot size look-up table;

a look-up table control operable to acquire a cluster factor from the dot cluster look-up table, to acquire a dot density factor from the dot density look-up table, to acquire a dot size factor from the dot size look-up table, the look-up

table control operable to acquire each factor from a look-up table entry corresponding to a given pixel's intensity.

31. The system of Claim 30 wherein the dot cluster look-up table, the dot density look-up table, and the dot size look-up table are a single look-up table.

32. The system of Claim 29, wherein:

the placement control is operable to generate the cluster factor and the dot density factor according to the pixel' s intensity; and

the size control is operable to generate a dot size factor according to the pixel's intensity.

33. A halftoning system, comprising:

a look-up table control operable to obtain a cluster factor corresponding to the intensity of a given pixel, a dot density factor corresponding to the pixel's intensity, and a dot size factor corresponding to the pixel' s intensity;

a placement control operable to calculate a threshold value as a function of a dot screen and the cluster factor, and to implement an error diffusion algorithm that is a function of the dot density factor and the threshold value in order to generate a dot placement factor; and

a size control operable to generate a halftone print code as a function of the dot size factor and the dot placement indicator.

34. The system of Claim 32, wherein the look-up table control, the placement control, and the size control are programs executed by an image forming device having a print engine operable to produce a halftone according to the halftone print code.

35. An image forming device, comprising:

a print engine operable to receive halftone print code and to produce a printed halftone;

a first look-up table having a plurality of entries, each entry corresponding to a pixel intensity and containing a cluster factor corresponding to that pixel intensity;

a second look-up table having a plurality of entries, each entry corresponding to a pixel intensity and containing a dot density factor corresponding to that pixel intensity;

a third look-up table having a plurality of entries, each entry corresponding to a pixel intensity and containing a dot size factor corresponding to that pixel intensity;

a look up table control operable, using a known pixel intensity, to acquire corresponding cluster, dot density, and dot size factors from the first, second, and third look-up tables;

a placement control operable to calculate a threshold value as a function of a dot screen and an obtained cluster factor and to implement an error diffusion algorithm that is a function of an obtained dot density factor and the threshold value in order to generate a dot placement factor; and

a size control operable to generate and send a halftone print code to the print engine, the halftone print code being generated as a function of an obtained dot size factor and the dot placement indicator.

36. A system for generating a halftone from a plurality of pixels, comprising:

a means for modulating dot density according to pixel intensity;

a means for controlling a size of a dot cluster according to pixel intensity; and

a means for modulating dot size according to pixel intensity.